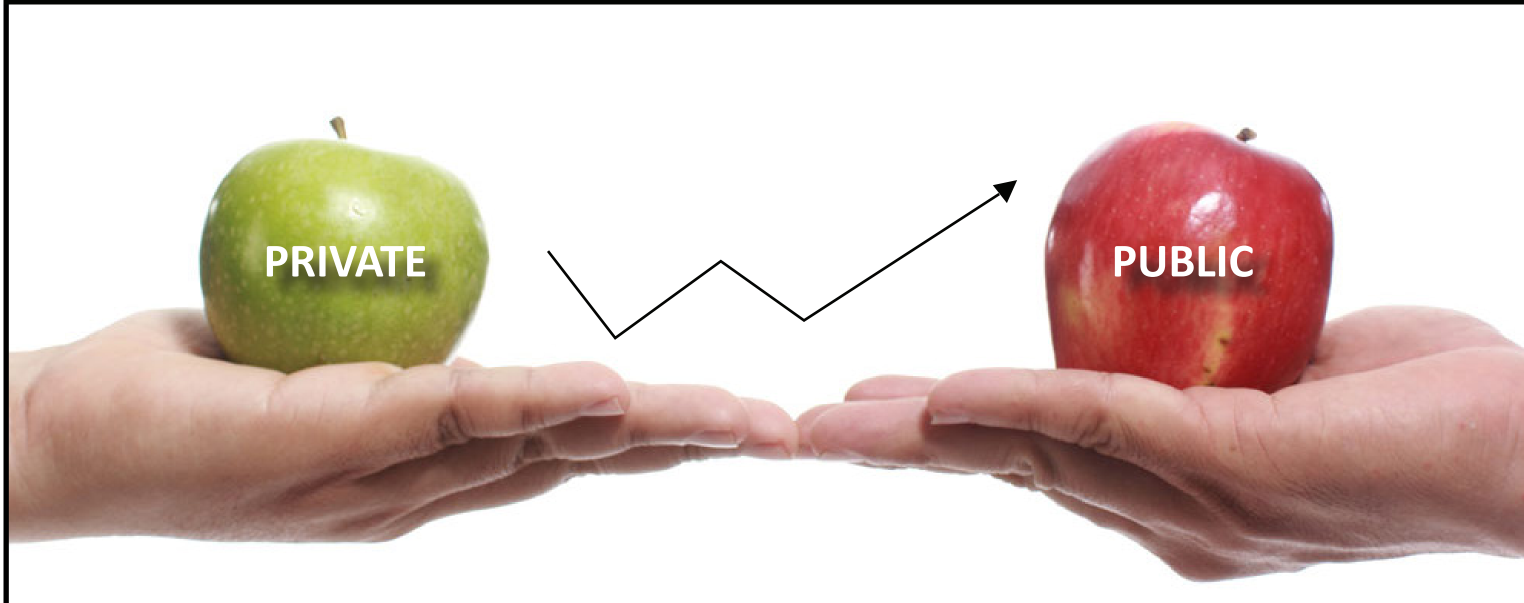

Unequal Pay:

Comparing State & Private Sector Employee Compensation in Delaware

by Andrew G. Biggs, Ph.D.

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Unequal Pay: Comparing State & Private Sector Employee Compensation in Delaware

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Executive summary

- The rising costs of government employee benefits are a concern for elected officials and citizens in Delaware and states around the country. Pensions, employee health coverage and retiree health plans have grown significantly more expensive in recent years, placing pressure on government budgets and causing citizens to be concerned that public employees receive more generous compensation than the taxpayers who fund their pay and benefits.
- Delaware's state government needs to attract and retain employees to accomplish the tasks set to them by citizens, but without overcharging taxpayers by paying excessive compensation. Experts agree that public employees should receive total wages and benefits compensation comparable to what those employees would receive in private sector positions. Setting compensation at market levels allows the government to maintain an adequate workforce without overcharging taxpayers.
- In this study I analyze non-public safety employees of the Delaware state government. I do not include public safety officers employed by the state, nor do I include local government employees or public school teachers. Appropriate compensation levels for government employees can be identified by looking at how workers with similar levels

of education, experience and other earnings-related attributes are paid in the private sector. For private sector employees, we rely upon U.S. Census Bureau data for wages and Bureau of Labor Statistics (BLS) data on employee benefits. For Delaware state government employees, we use Census and BLS data along with government programs data on pensions, health coverage and retiree health plans.

- After controlling for education, experience and other factors, Delaware state government employees receive wages that are about 12.4 percent lower than those of similarly-qualified private sector workers. But state government employees receive a benefits package that is approximately 53 to 102 percent more generous than is received by most private sector workers. In particular, health coverage, retiree health plans, and pension benefits are substantially more generous for state employees than for Delaware employees working in the private sector.
- The average Delaware state government employee in our data sample receives an annual salary of $48,967 plus annual benefits, either received in that year or accrued toward retirement, worth between $36,563 and $48,230, depending upon the method used to value the accrual of future pension benefits. A private sector employee with similar education, experience and other characteristics would receive about $55,039 in annual salary, but only about $23,775 in fringe benefits.
- In total, the average Delaware state government employee receives between $88,530 and $97,197 while a comparable private sector employee would receive total pay and benefits of about $78,814 per year. Thus, on average, Delaware state government employees receive total pay and benefits that are between $6,716 and $18,383 per year higher than those employees would be likely to receive in private sector positions, a difference of between 8.5 percent and 23.3 percent.

- Pensions, health coverage and retiree health care programs are large and rapidly rising budgetary burdens of public employee compensation, as well as the elements of compensation that are most generous relative to the private sector. Were Delaware to compensate state government employees at market rates, it would save between $260 million and $720 million in annual compensation costs.

Introduction

Public employee compensation is a matter of policy debate and political controversy in states and cities around the country. Yet discussions of public sector pay are rarely informed by hard data. Many public employees are under the impression that they could earn higher pay and benefits "on the outside." And many private sector workers envy the generosity of public sector benefits, without recognizing that the average public employee is often more educated and experienced than the average worker outside government.

Public sector pay enters the policy discussion from two directions: from a top-down perspective, policymakers care about the total costs of employee compensation, in particular pension and health plans. Delaware's state government is currently struggling to pay the rising costs of state employee health coverage, which are projected to reach $1 billion by 2020.[1] Gov. Jack Markell has proposed that current state employees bear a larger share of their health costs and that newly-hired workers participate in high-deductible health savings accounts. Likewise, government contributions for the Delaware State Employees' Pension Plan have risen six-fold since 2001.

On top of these budgetary concerns, however, ordinary citizens are sometimes concerned that that public sector employees receive higher pay and benefits and better job security than do the taxpayers who support them. For instance, during the period 2009-2012, workers who self-identified as their last job being a Delaware state government employee had an unemployment rate of 3.7 percent, while private sector workers with similar education, experience and other factors had an unemployment rate of 7.9 percent. Delaware has not laid off employees in recent years; thus, it is likely that state employees reporting being unemployed may be workers who left state employment – such as to raise children or after the end of a seasonal job – and have re-entered the workforce but not yet found a new job.[2] In other words, while the individual is unemployed and his or her last job was in the state government, most of these individuals likely left their state jobs voluntarily.

These two elements – a top-down budgetary perspective and a bottom-up fairness perspective – combine to make public sector pay a contentious issue.

However, public sector compensation is also a complex issue. One cannot simply compare the average salaries of public and private sector workers, since they are not identical in terms of the factors that help determine pay.[3] Moreover, much of the compensation public employees receive is in the form of pensions and retiree health benefits which will be paid years or decades in the future. These future benefits must be converted to a "present value" that is comparable to the employer contributions that most private sector workers receive toward their 401(k) retirement plans.

When an issue is as contentious and politically-driven as public employee pay, it is important to bring data and analysis to the question. The following sections consider the salaries and benefits paid to Delaware state government workers compared to private sector workers with similar measurable qualifications.[4] Note that the workers considered here do not include local government employees or public school teachers, nor do they include state government employees in public safety positions. While similar methods can be applied for these employees, the underlying data used to analyze their compensation will differ from that of state government employees. That is, they have different salaries, may participate in different health and pension programs, and so forth. Thus, the conclusions drawn here cannot be extended to all government employees in the state of Delaware.

Salaries

Comparisons of public sector salaries to private sector pay have been conducted in a variety of ways. Some studies of public sector pay perform a "job to job" analysis: that is, they compare compensation for a specific job in the public sector to the same job in the private sector. Such analyses can be useful and compelling due to their understandability, but suffer from the fact that many government jobs don't have clear private sector matches. Moreover, even where job matches exist, we cannot be sure that employees performing a given job in the public sector have the same level of education and experience as those performing the same job at a private sector employer. If public sector employees have different skills levels – say, different levels of education and experience – than private sector workers holding similar jobs, then a job-to-job comparison will not capture all aspects of the compensation question.

Another strand of analysis compares the pay of state and local government employees to private sector employees who perform work duties of similar difficulty and complexity.[5] In 2011 two economists at the Bureau of Labor Statistics, Maury Gittleman and Brooks Pierce, published a study concluding that state government employees receive wages slightly below, and local government employees slightly above, private sector jobs demanding similar levels of skill.

However, most economists choose to compare employees based not on their job duties but upon their qualifications – namely, education and experience and other factors that affect pay, such as marital status, the location in which a person lives, and so forth. Economists adopt this "human capital" approach because research has tended to find that the most important determinant of pay is not the job but the skills of the employee who holds the job. Employees with similar skills will tend to earn similar salaries, even if they work in different jobs. Likewise, employees with different levels of education and experience will usually earn different salaries, even if they work in the same type of job.

For these reasons, most economic studies of comparative pay rely on a human capital model in which statistical analysis is applied to a wide variety of factors that are correlated with workers' pay, including their education, experience, location, race, gender, ethnicity and other factors – including whether they work for government or in the private sector. Once pay differences associated with these factors are controlled for, remaining differences between public and private workers are assumed to derive from the sector in which they are employed.

My approach is to use regression analysis to calculate how different factors, including whether one works for state government or the private sector, influence salaries. So-called "wage regressions" have been used to analyzed public sector pay since then-Princeton economist Sharon Smith's 1976 comparison of federal employee and private sector salaries.[6] Since that initial study, literally hundreds of economic analyses of public sector pay have been published, looking at pay in all levels of U.S. government as well countries abroad. A very similar approach has been used to analyze pay differences attributable to race, gender or union membership. While my analysis adds some additional data that were not available when the field of public-private pay analysis began, the methods used to compare Delaware state employee salaries to those of private sector employees are well within the mainstream of public policy analysis.[7]

For salary comparisons, I use data from the U.S. Census Bureau's American Community Survey (ACS) from the years 2010 to 2014 to ensure adequate sample sizes. The sample is limited to individuals who work for the Delaware state government or for the private sector; federal and local government employees and employees of non-profits are excluded. Teachers and public safety officers are not included in the sample, as unique characteristics of their professions may tend to skew the results.[8] The sample is limited to individuals who work 35 or more hours per week and 48* or more weeks per year, meaning that part-time and seasonal employees are not considered.

*Number was corrected on 5/3/16

The dependent variable is the natural log of annual wage earnings. Using the natural log is a standard approach that helps the model better account for how wages tends to be distributed. The independent variables are: years of education; college major (for those with a Bachelor's Degree and above); potential work experience (equal to age minus years of education minus 6) and experience-squared; occupation; place of residence (based both upon the Census Bureau's Public Use Microdata Areas[9] and whether the individual reports living in a city, suburb or outside a metro area); usual hours of work per week (self-reported), with a minimum of 35 hours; gender; race; Hispanic heritage; marital status; immigrant status; year; and whether the individual is a state government employee. The inclusion of tight occupational controls is an attempt to perform as much of a "job to job" analysis as possible, while human capital controls such as education and experience supplement the job comparison where possible and substitute for it when there is no comparable job between the public and private sectors.

Table 1 illustrates why such calculations are necessary. The state government and private sector workforces differ in annual wages and salaries, but they also differ in a number of characteristics that are related to earnings in the labor market. The two labor forces have a different demographic makeup, in terms of age, gender, race, immigrant status and education, and they work different hours each week.

Table 1. Summary information on full-time, full-year Delaware state government and private sector employees

	State employee	Private sector
Annual salary	$48,967*	$61,092
Weekly work hours	40.9	43.7
Years of education	14.8	13.7
Immigrant	7.7%	11.4%
Age	46.3	43.7
Female	60.8%	43.4%
Black	18.2%	12.1%

Source: Author's calculations from ACS data, 2010-2014

Two other factors are worth mentioning. First, the ACS data include a variable for the employee's undergraduate college major. This is important, since certain college majors lead to higher pay in the workforce than others.[10] If the Delaware state workforce and private sector employees tended to major in different fields – for

*Number was corrected on 5/3/16

instance, one group was more likely to major in STEM fields while the other sector consisted of English literature majors – one would expect to find pay differences between them. The ACS, unlike other datasets such as the Current Population Survey, allow us to control for these differences.

Second, the ACS contains more detailed data on the location within the state in which the employee lives. As Texas A&M Professor Lori Taylor has shown, geographic controls are important in public-private pay comparisons to help account for differences in wages and costs of living between geographic areas, such as cities, suburbs and rural locations.[11] If state government employees and private sector workers tend to live in different areas – for instance, one group is more likely to live in cities, where both wages and the cost of living are higher, while the other group lives in suburban or rural areas with lower pay and lower costs of living – failing to control for geography can create the appearance of pay differences that might not actually exist. This issue comes about not due to formal locality pay for state government employees, but merely due to how local costs of living can affect overall wage levels. The ACS has better geographic controls than most other datasets.

A third factor is whether wage comparisons should compare for the size of the firm at which the individuals works. Some previous research, including Biggs and Richwine (2014), includes a firm size control while other research, such as Gittleman and Pierce (2011), does not. In the private sector, larger firms tend to pay slightly higher wages than smaller firms, even after controlling for differences in the education and experience of their employees. The problem is that economists do not know for sure why this occurs, nor whether or how to apply a firm size premium to the public sector.[12] In the private sector, it is possible that larger firms are more productive than smaller ones or hold some sort of monopoly position in a market, and that these firms share their additional earnings with employees. Alternately, larger firms might be better at recruiting more productive employees even within statistically controllable groups – for instance, the college graduates employed at a large firm might be more skilled than college graduates at smaller firms. Despite significant research, it is not a settled question.

Moreover, it is not clear whether the discussed explanations for firm size-related wage differences in the private sector similarly apply to the public sector. For instance, does government's large size make it more productive? Do government jobs attract more-capable individuals within any level of educational attainment? Recent research shows that after controlling for educational attainment, state and local government employees, in particular those with a college education, score lower on tests of cognitive ability than private sector workers with the same level of education.[13] In the private sector, wages are strongly correlated with cognitive test score results even after controlling for educational attainment. This indicates that while large private sector firms may recruit more skilled employees within a given educational group, public sector entities recruit somewhat less skilled employee. For this reason, the wage regressions performed later do not include a control for firm size.

Regression analysis conducted using the ACS data indicate that, after controlling for a range of factors relevant to pay, Delaware state government employees earn annual salaries that are 12.4 percent lower than private sector employees. As a test, I re-ran the figures using the time period from 2003 to 2014, finding a state government salary penalty that is about 0.6 percentage points smaller. This indicates that the 12.4 percent salary penalty found for the 2010-2014 period is not unique to post-recession economic conditions. [14]

The adjusted R-squared value of the regression is 0.58, which indicates that the variables included in the regression can account for 58 percent of difference in salaries from one person to another. This would generally be considered a reasonable result for a wage regression, given that a number of factors affecting salary – from the employee's own level of motivation and initiative to the quality of the college he might have attended – are not included in the ACS data.

A 12.4 percent salary penalty indicates that, if an average Delaware state government employee receives an annual salary of $49,967, an otherwise-identical private sector employee – meaning, one with the same level of education, experience and so forth – would receive an annual salary of about $55,039. The results should not be taken to mean, however, that every state government employee receives a precisely 12.4 percent salary penalty. For instance, public employees with lower educational attainments receive relatively higher pay than more educated public employees. Moreover, any given state employee may be paid more or less than he or she might receive in the private sector. However, these results indicate that, as a group, Delaware state employees receive salaries that are about 12.4 percent lower on average than are received by similar workers employed by private sector employers in Delaware.

Benefits

Salaries are just one component of overall compensation received by employees. The total compensation received by employees also includes benefits, which can include health insurance coverage, retirement plans, paid vacation, taxes paid on employees' behalf and other fringe benefits. In the public sector, benefits are a particularly important component of employees' compensation packages. Moreover, in Delaware and many other states, the main disputes over public employee pay relate not to salaries but to benefits such as health and pension coverage, because it is these plans that place disproportionate pressure on budgets. Thus, it is important to include benefits in any public-private pay comparison.

Benefit data arise from a variety of sources. For private sector employees, most data is derived from unpublished tabulations of the Bureau of Labor Statistics Employer Contributions for Employee Compensation (BLS ECEC) series which were provided to the authors of Biggs and Richwine (2014). These data are tabulated for private sector workers employed in establishments of 100 or more employees located in the South Atlantic Census Division, which includes Delaware. For private sector employees these data provide information on all benefits except for retiree health coverage, which is calculated separately by the author.

For employees of the Delaware state government, BLS ECEC data is used for a small number of relatively minor benefit categories, such as paid time off and employer payroll taxes paid on workers' behalf. However, the major benefits – health coverage, retiree health care and pensions – are drawn from data sources specific to state employees. In most cases, benefits are expressed as a percentage of salaries and that percentage is applied to the salary figures derived from the ACS sample to calculate total compensation. For instance, if an employee earns a $50,000 salary and receives benefits equal to 50 percent of his wages, his total compensation would be equal to $75,000.

Health coverage

Health coverage is an important component of employee compensation. Most state employees participate in the State Group Health Program (GHIP). The State Employees Health Plan Task Force found, in a December 2015 report, that the GHIP had lower employee contributions and less effective cost-sharing than most other public sector and private employer health plans contained in survey data gathered by Aon Consulting. The GHIP offers a variety of health plans for which the state pays between 87 percent and 96 percent of the premiums. Put in terms of the ratings used in the Affordable Care Act Marketplaces -- bronze, silver, gold and platinum – the average GHIP plan would qualify as "platinum" coverage.[15]

The Bureau of Labor Statistics finds that, for private sector employers in the South Atlantic region in 2015, employers generally paid about 78 percent of the costs of single-employee health coverage and 64 percent of the costs of family health coverage.[16] Given that employees generally split about evenly between single and family health coverage, this implies that private sector employers in Delaware likely pay about 71 percent of their employees' health premiums.

However, these figures do not tell the whole story. First, not every private sector employer offers health coverage. And second, the generosity of health plans differs from employer to employer, so knowing the percentage of the premium paid by the employer does not necessarily indicate the dollars spent by employers on their employees' behalf.

A 2014 Pew Foundation analysis of state employee health costs found that the average employee-only health plan offered to Delaware state government employees had a total monthly premium of $563, of which the employee paid 10 percent, or $56.30 monthly. The average family policy had a monthly premium of $1,203 of which employees also paid an average of 10 percent[17] which equates to $120.30 each month. The average total per employee premium was $975 per month, of which the state government paid about 90 percent, or $878. On an annual basis, per employee health costs borne by the government were thus $10,530, or about 21.5 percent of the $48,967 average state government salary in the ACS dataset.

For private sector employees we turn to the Bureau of Labor Statistics Employer Costs for Employee Compensation dataset. These data indicate that for private sector workers in larger establishments, employer health contributions were on average equal to 14.2 percent of salaries. Annual salaries for our American Community Survey sample of full-time private sector employees equaled $61,092, implying annual employer health expenditures of approximately $8,687. In dollar terms, Delaware state government employees receive a health coverage package that is approximately $1,843, or 21 percent, more generous than is offered to private sector employees.

Retiree health benefits

In addition to health coverage while working, employees of the Delaware state government have access to retiree health coverage through the State of Delaware Postretirement Health Plan. State employees hired prior to 2012 become eligible for retiree health benefits at age 62 with five years of credited service, age 60 with 15 years of service, or at any age if they have 30 years of service.[18] The Postretirement Health Plan provides primary health insurance from retirement through Medicare eligibility at age 65, and supplementary health coverage thereafter. Spouses and widows are also eligible for coverage under the plan with the state paying the same share of costs as for retired workers. Overall, the state pays between 87 percent and 100 percent of retiree health care premiums, depending on the plan.

Retiree health benefits often are referred to as OPEBs, meaning Other Post-Employment Benefits. Most pay studies to date have ignored the value of retiree health coverage, but the accruing costs of OPEBS to state governments – and the value of such benefits to employees – can be substantial. A number of states have reduced retiree health coverage in recent years, but these benefits remain generous compared to the private sector.

The Postretirement Health Plan offers three options with different levels of coverage, co-payments and deductibles. For the purposes of public-private compensation comparison, we are not interested so much in how much beneficiaries pay toward their care as how much the government contributes.

For retiree health coverage, the important number is not the dollar value of benefits being paid out to today's retirees. Rather, it is the value of the future health benefits being earned by today's employees. This value is reflected in what is known as the "normal cost" of the plan. The normal cost is calculated and disclosed as part of accounting standard set by the Governmental Accounting Standards Board (GASB). In 2014, the normal cost of retiree benefits for employees enrolled in the Postretirement Health Plan was $186.3 million, equal to 9.44 percent of employees' wages.[19] In other words, the retiree health benefits accruing to Delaware state government employees in a given year are equivalent to a 9.44 percent increase in their salaries. It is important to note that these figures are calculated relative to the earnings of all regular state government employees, not merely those who qualify for health benefits at retirement. Thus, the 9.44 percent figure can be applied to the earnings of the average Delaware state employee as the implicit compensation he or she receives via the Postretirement Health Plan.

Calculating the value of retiree health benefits for private sector workers is far more problematic, and not simply because there are many more private sector than government employers. The value of retiree health coverage is not included in the ECEC data set. The reason is that, since most retiree health coverage is unfunded and financed on a pay-as-you-go basis, there is no employer contribution for current workers.[20] Nevertheless, where employees are being promised future benefits those benefits should be counted.

Retiree health coverage is far less common in the private sector, even among larger employers, and measuring the cost of plans that do exist in the private sector is a challenge. Data are sparse, and the landscape is changing rapidly. In addition to changes already under way, the introduction of health exchanges under the Affordable Care Act may prompt more private employers to drop retiree health coverage. All these factors make calculating the current value of future retiree health entitlements uncertain.

According to data from the Medical Expenditure Panel Survey (MEPS), as of 2014 9.3 percent of Delaware employers offer health coverage to retirees below the age of 65 and 9.0 percent offer coverage to retirees ages 65 and over.[21] However, as Paul Fronstin and Nevin Adams of the Employee Benefit Research Institute (EBRI) note, such statistics "should not be interpreted as meaning that [similar percentages] of workers should expect supplemental health coverage." [22] As of 2003, roughly one quarter of private firms paying benefits to current retirees did not offer them to new retirees.[23] An Aon Hewitt survey found that, in 2011-2012, 11-12 percent of large employers tightened eligibility requirements for current employees.[24] Similarly, a 2012 Mercer survey found that 17 percent of large employers who currently offer retiree health coverage will soon eliminate it for future retirees.[25] Thus, one cannot simply extrapolate from the share of current retirees receiving benefits to the share of current workers accruing benefits.

Moreover, even at firms that continue to offer health benefits for future retirees, not every employee will qualify to receive such benefits. As Fronstin and Adams point out, part-time employees often are not eligible for retiree health coverage, nor are employees who retire without a required minimum job tenure. Eligibility is important, as the normal cost figures cited above for Delaware state government employees are for *all* current employees, not merely for those who will actually qualify for benefits in the future.

Finally, many private-sector firms offer retiree health coverage on an "access only" basis, which means that retirees may buy into the health plan offered to employees but must do so using their own funds. As of 2010, half of firms offering retiree health coverage provided access with no premium support; 24 percent paid premiums up to a defined dollar limit; and 25 percent had no specified dollar limit.[26] Granting retirees access to employer-sponsored health coverage is valuable and must be counted as an implicit subsidy, since including retirees in the insurance pool increases costs for the employer and for working-age participants. However, access-only is not as valuable as an explicit subsidy paid by employers. In the public sector, a far greater share of the retiree health premium is covered by employers.[27]

Based on these factors, Biggs and Richwine (2014) adjusted Congressional Budget Office figures for what we considered to be reasonable assumptions regarding the number of firms offering retiree health coverage; the percentage of employees assumed to be eligible at retirement; and the percentage of total premiums paid for by employers.[28] These figures were then adjusted on a state-by-state basis based on the current percentage of employers offering retiree health coverage. Based on those calculations, updated with 2014 MEPS data, Delaware's state-specific estimate for the value of accruing retiree health benefits for private sector employees comes in as 0.36 percent of annual wages. This figure is substantially more uncertain than others used in this study, given the lack of solid available data for private sector employees. However, very little rides upon these assumptions in terms of the overall conclusions to be drawn from this study. There are no plausible assumptions whereby retiree health coverage for the average private sector worker comes anywhere close to the public sector in terms of either prevalence or generosity.

Retirement Plans and "Pension Compensation"

Pensions are one of the most costly, and controversial, aspects of public employee compensation. Most state employees participate in the Delaware State Employees' Pension Plan (SEPP). The plan's funding level declined from 107 percent funded in 2001 to 92 percent funded in 2015, due to investment returns that did not keep up with the plan's projections. Meanwhile, annual required employer contributions rose nearly six-fold, from 1.6 percent of employee payroll in 2001 to 9.58 percent for fiscal year 2016. As of June 30, 2015 the plan faced unfunded liabilities of $761 million.[29] The Delaware state pension plan is not poorly-funded compared to plans in states such as New Jersey or Illinois.

The State of Delaware has been more responsible than most in making its annual pension contributions. But, like most other states, it has attempted to keep these pension contributions low by shifting its investments toward higher-returning, but riskier, assets. From 2001 through 2015, Delaware more than doubled its portfolio allocation to so-called "alternative investments" such as hedge funds, private equity, real estate and venture capital. These investments, while promising high returns, are also substantially riskier than stocks.[30] For instance, Wilshire Consulting assumes that domestic stocks have a standard deviation of annual returns of 17.0 percent while private equity has a standard deviation of returns of 27.5 percent. Had the Plan not shifted to a riskier portfolio, its current contributions would be even higher. The downside of a riskier portfolio is that it generates greater volatility of required government contributions from year to year.[31] When pension contributions change rapidly from year to year, this makes it more difficult for elected officials to manage the budget and makes it more likely that the government may not make its full pension contribution every year.

With these high-level issues as context, it makes sense to analyze how the Delaware State Employee Pension Plan's benefits compare to those paid to workers employed in the private sector.

However, it is difficult for non-specialists, such as elected officials or the news media, to compare the generosity of pensions provided to public sector employees. Most private sector employees participate in defined contribution (DC), 401(k)-type pensions, in which the employer makes a contribution to the worker's account each year but does not promise a specific benefit. Delaware's state employees, by contrast, participate in a traditional defined benefit (DB) pension in which they are promised a specific benefit and the employer alters its contributions from year to year to ensure that the benefit is paid.

These fundamental differences in plan design make it more difficult to compare the value of the two types of benefits. As economists Dale Belman and John Heywood put it, "Since one type of plan fixes the costs, but provides an uncertain benefit, and the other type of plan fixes the benefit but gives employers an uncertain cost, it is very difficult to compare the relative costs and benefits of the plans. This complicates public/private comparisons because the private sector is more likely to provide defined contribution plans and the public sector defined benefit."[32]

In this section we calculate what might be called "pension compensation." Pension compensation is the value to employees of the future retirement benefits they earn in each year, net of any contributions they make to the plan out of their own salaries. For a private sector worker with a defined contribution plan, calculating pension compensation is simple: it is nothing other than the amount their employer contributes to their 401(k). For the typical employee this employer contribution is equal to about 3 percent of wages, with 90 percent of private sector employers contributing less than 6 percent of pay.[33]

For a public sector worker with a defined benefit plan, pension compensation is the present discounted value of the future benefits he accrues in a given year, net of the employee's own contributions. In the Delaware SEPP, most employees contribute 3 percent of their pay, though employees hired since 2012 contribute 5 percent.

Those future benefits are discounted to the present at an interest rate commensurate with the risk of those benefits. The risk of state employee pension benefits, and thus the discount rate used to calculate their present value, is discussed in greater detail below.

For simplicity, however, these calculations of pension compensation answer the question: How much would a private sector worker need to save in his 401(k) plan to provide a retirement benefit with the same generosity *and* the same risk as a public employee with a defined benefit pension plan? For instance, if a state government employee with a defined benefit pension receives pension compensation equal to 10 percent of his wages, that implies that 10 percent of wages invested each year in a 401(k) plan, holding safe assets, would produce the same benefit in retirement as the state defined benefit pension plan. For purposes of this analysis we abstract from smaller differences between the two types of plans – say, administrative costs – to focus on the two main differences: generosity and risk.

As with retiree health benefits, the value of pension benefits accruing to employees in a given year is represented by the "normal cost" of the pension plan. Unlike retiree health benefits, however, this normal cost must first be adjusted to account for differences between the risk of the investments used to fund pensions and the risk of the benefits themselves. The reason is that most public employee pension plans are funded with risky assets that have high expected returns. The Delaware Employees' Pension invests about 70 percent of its assets in domestic equities, international equities and alternative investments such as hedge funds, private equity and venture capital.

The risk of these investments is far greater than the risk of the benefits offered by the plan, which means that the state government – and thus the taxpayer – is providing employees with an effective guarantee against low market returns. The high returns assumed for risky investments lower the current contribution needed to fund the normal cost of the pension, but come with a danger – called a "contingent liability" – that expected returns won't be realized. If this happens, it is the government, not the employee, who must make up the difference.

For instance, about 25 percent of the current government contribution to the Delaware pension is to cover unfunded liabilities from previous years, almost all of which are due to the plan's investments failing to achieve their assumed returns. This differs significantly from a 401(k) plan, where it is the employee's responsibility to adjust his saving rate or his retirement age in response to an investment downturn.

Having the government bear the market risk in a defined benefit pension plan is a benefit to employees participating in that plan, but a cost to the taxpayer. The way that analysts account for this is to re-calculate the normal cost of the pension using an interest rate whose risk matches the benefits that are promised. Public employee pensions are intended to be guaranteed, are advertised to employees as guaranteed, and in many states are guaranteed by law. In Delaware, courts have recognized that vested employees who have fulfilled retirement eligibility requirements have a contractual right to their pension benefits. [34] These reasons point toward using a lower interest rate in calculating public employees' pension compensation.

The Congressional Budget Office adopted such an approach in calculating pension compensation for federal government employees and in valuing the liabilities of state and local pension plans[35]; the federal Bureau of Economic Analysis uses a similar approach in the National Income and Product Accounts to calculate pension compensation for federal, state and local government employees[36]; and Biggs and Richwine (2014) used this approach in comparing compensation for state government employees around the country. Once the normal cost of the pension is adjusted to an appropriate interest rate, the employee contribution is then subtracted to produce net pension compensation. This figure can then be compared to contributions private sector employers make to the 401(k) plans that most of their employees would have access to.

State and local government pensions typically calculate their annual contributions using an interest rate of between 7 and 8 percent. The Delaware SEPP assumes an annual investment return of 7.2 percent. For public employees *as a group*, this is mathematically identical to the employer guaranteeing a 7.2 percent return on both the employer and employee contributions. This does not imply that every individual employee receives an implicit return of 7.2 percent In general, short-term employees receive lower implicit returns from defined benefit pensions while full-career employees receive higher returns.[37] But what the employer is doing for employees as a group is providing a guaranteed return on both employee contributions *and* their employers' pension contributions equal to the assumed return on pension investments. This makes these defined benefit plans far more generous than defined contribution plan that had the same employer contribution but no such guarantee. As economist Alicia Munnell and her co-authors note:

> Contributions to private sector 401(k) plans and public sector defined benefit plans are not comparable. The public sector contribution guarantees a return of about 8 percent, whereas no such guarantee exists for 401(k)s. Thus, the public sector contribution under-states public sector compensation.[38]

Put simply, a dollar of employer contributions to a defined benefit pension *plus* an effective guaranteed return of 8 percent is much more valuable to the State employee, but more costly to the taxpayer, than a dollar of defined contribution pension contributions that does not include such a guarantee. As the Bureau of Economic Analysis notes, "Contributions aren't always a good approximation for the value of benefits accrued through service."[39]

The Delaware SEPP assumes an investment return of 7.2 percent, continuously compounded. To calculate the value of pension compensation to employees, we must convert the plan's normal cost as calculated using a 7.2 percent assumed investment return to a value based on a discount rate that more closely matches the safety of the benefits offered by the plan. I use two approaches here to illustrate a reasonable range of outcomes.

The first approach values public employee pension benefits using the same approach that is applied for private sector workers who participate in defined benefit plans. Those plans are required under federal law to discount their liabilities using a corporate bond yield. In other words, this approach assumes that pension benefits promised by a company carry the same risk as bond payments promised by that company. This approach produces similar results to the method used by the federal government's Bureau of Economic Analysis in calculating employee pension compensation for the National Income and Product Accounts. Using this approach, I discount Delaware state employee pension benefits using the Citibank Pension Discount Curve, which used by private sector sponsors of defined benefit plans to value their own benefits.[40] As of January 31, 2016, the Citibank average discount rate for plans with an intermediate duration of liabilities was 4.1 percent.

Others, however, argue that accrued pension benefits have proven to be very safe, often safer than explicit debt issued by state and local governments. For instance, pensioners in bankrupt cities such as Detroit, Michigan or Stockton and San Bernardino, California have accepted far smaller losses than bondholders, who often emerged with just pennies on the dollar. These analysts argue that valuing pension liabilities using a Treasury bond rate better reflects their safety. For instance, the Society of Actuaries' Blue Ribbon Panel on Public Pension Funding recommended that pensions report their liabilities as calculated using a 10-year U.S. Treasury yield, which as of February 1, 2016 was 1.97 percent.

Public pension liabilities aren't traded in financial markets, so we have no precise data on how they should be valued. However, performing two pension compensation calculations – first at a 4.1 percent return, as is applied to corporate pensions, and second at a U.S. Treasury yield of 1.97 percent – provides a reasonable lower and upper bound on the level of pension compensation offered through the Delaware State Employees' Pension Plan.

As of the latest actuarial valuation, published in January 2016, Delaware SEPP has a total normal cost, calculated at a 7.2 percent discount rate, of 6.93 percent of employee payroll. When employee contributions of 3 percent of payroll are included, the total normal cost rises to 9.93 percent of wages. (Employee contributions are used only to pay the normal costs of a pension, not to cover unfunded liabilities.) When the discount rate is lowered to 4.1 percent, the total normal cost increases to 25.8 percent of payroll. Net of employee contributions, "pension compensation" totals 22.8 percent of wages. If the discount rate is lowered to the Treasury yield of 1.97 percent, then the total normal cost more than quadruples to 49.6 percent of payroll and pension compensation rises to 46.6 percent of pay.

Put in simple terms, to equal both the level and the safety of benefits offered to Delaware state government employees, a private sector worker with a 401(k) would need to save between 23 and 47 percent of his salary, invested in safe assets. This sounds like an extraordinary amount, until one considers the statistics. For instance, according to the Delaware SEPP annual report, the typical employee retired after 30 to 35 years of employment and received a benefit equal to about 61 percent of his final salary, *guaranteed*.[41] That is a lot of money to accumulate over what, to many private sector workers, is not a full working career. In addition, that typical employee would receive a Social Security retirement benefit equal to about 32 percent of his final pay, assuming retirement at age 62, for a total retirement income of about 92 percent of his final earnings. That is well above the 70 percent "replacement rate" that most financial advisors allows an individual to maintain his pre-retirement standard of living.

This comparison does not reflect a difference in efficiency between defined benefit and defined contribution pension plans. Rather, it reflects an "off the books" commitment by the Delaware state government to increase pension contributions if investment returns fall below the 7.2 percent assumed by Delaware SEPP. The commitment is a costly form of compensation to public employees that most private sector workers do not receive. Any public-private pay comparison must include that guarantee, as it is of substantial benefit to public employees and a substantial cost to the taxpayer.

For private sector workers, we rely on BLS ECEC data on employer contributions to private sector pensions, including both 401(k) plans and traditional defined benefit pensions. These data indicate that, on average, private sector employers contribute an amount equal to 3.1 percent of employee wages to defined contribution pension plans and 2.0 percent to defined benefit pensions, for a combined total employer contribution of 5.1 percent of wages. Note that most private sector workers do not have both a defined contribution and a defined benefit pension. However, these figures capture averages across the private sector workforce and thus both are included.

The calculations here show that pension compensation for the average Delaware state government employee ranges from a reasonable lower bound of 23 percent of wages if one considers benefits to as risky as corporate bonds, to a reasonable upper bound of 47 percent of pay if one considers benefits to be as guaranteed as U.S. Treasury bonds. Even at a midpoint of the two estimates, pension compensation for the average Delaware state government employee is roughly seven times more generous than for the average private sector worker.

Pension benefits are not only a substantial part of the state budget, but they also are an area where public sector compensation differs most greatly from what is provide to private sector employees.

Other forms of compensation

In addition to pensions, health coverage and retiree health benefits, employers provide a number of smaller fringe benefits. These other benefits include paid leave, such as vacation, holiday and personal time; employer premiums paid toward life and disability insurance; and "legally-required benefits," which can include employer taxes toward Social Security,[42] Medicare, unemployment insurance, and worker's compensation. For these benefits we rely upon data from the BLS's ECEC dataset.[43] Because these ECEC-derived benefits are calculated for all states in the South Atlantic Census region, they should be regarded as approximations of the amounts paid by both government and private sector employers in the state of Delaware. However, differences between state government employees and private sector workers in these forms of compensation are far more modest than with regard to health coverage, retiree health or pension benefits. Figures for these additional fringe benefits are shown in Table 2in the following section.

Total Compensation

Full-time, full-year Delaware state government employees in the ACS sample have an average annual salary of $48,967, compared to an average annual salary of $61,092 for private workers in the ACS. Once we account for differences in education, experience, work hours and other factors, the difference in salaries between Delaware state government and private sector employees equals approximately 12.4 percent. This implies that if the average state government employee worked in the private sector, he or she would be likely to earn an annual salary of about $55,039. Thus, at least for the state of Delaware, the common view that government jobs pay lower salaries than the private sector appears to be true.

However, a second common view – that government jobs pay more generous benefits than private sector positions – also is true in Delaware. Some of these benefits are paid in the year they are earned, such as employee health coverage or paid time off. Other benefits, such as pensions and retiree health coverage, often are not paid until years or decades in the future. But all need to be counted if we wish to compare public and private sector compensation. All told, the average Delaware state government employee receives benefits equal to between 74.7 percent and 98.5 percent of his annual salary, depending upon the discount rate we apply to the defined benefit pensions an employee earns each year. Benefits for the average Delaware state government employee are between 53 and 102 percent larger than those earned by a comparable employee working in the private sector. Total compensation for the average state government employee ranges from $88,530 to $97,197, again depending upon how we value pension benefits.

A private sector employee who is comparable to a state government employee in terms of earnings-related characteristics receives total fringe benefits equal to 43.2 percent of his salary, mostly due to less generous health coverage, pensions and retiree health care. This implies that total compensation for a comparable private sector employee is equal to about $78,814 per year.

Overall, while Delaware state government employees receive a salary penalty relative to private sector workers, their more generous benefit result in state employees receiving a total compensation premium of between 8.5 percent and 23.3 percent. In dollar terms, the state employee compensation premium ranges between $6,716 and $18,383 per year.

These results should not be taken to imply that every Delaware state government employee is "overpaid." As discussed above, the measured compensation premium is an average and does not preclude the possibility that any given state government employee receives a fair market compensation package or potentially even receives less than he or she might in the private sector.

Table 2. Summary of Results: Delaware State Government Employees and Comparable Private Sector Employees. Pension benefits discounted at corporate bond yield of 4.1%.					
Compensation component		**State and local government**	**Comparable private sector**	**State and local government**	**Comparable private sector**
Raw salary				$ 48,967	$ 55,039
Benefits		**As percent of salaries**		**Dollars**	
Total benefits		**74.7%**	**43.2%**	36,563	23,775
Paid leave		*10.9%*	*11.5%*	5,323	6,313
	Vacation	4.1%	6.0%	2,013	3,280
	Holiday	3.1%	3.6%	1,498	1,998
	Sick	2.7%	1.3%	1,342	688
	Personal	1.0%	0.6%	470	347
Insurance		22.1%	15.2%	10,834	8,388
	Life	0.2%	0.3%	103	160
	Health	21.5%	14.2%	10,530	7,827
	Short-term disability	0.1%	0.5%	64	253
	Long-term disability	0.3%	0.3%	137	149
Retirement and savings		*31.8%*	*5.5%*	15,577	3,004
	Defined benefit	22.8%	2.0%	11,144	1,105
	Defined contribution	0.0%	3.1%	-	1,701
	Retiree health coverage	9.1%	0.36%	4,433	198
Legally required benefits		*9.9%*	*11.0%*	4,830	6,071
	Social Security	6.2%	6.2%	3,036	3,412
	Medicare	1.6%	1.7%	764	930
	Federal unemployment insurance	0.0%	0.1%	1	77
	State unemployment insurance	0.4%	0.9%	191	484
	Workers' compensation	1.7%	2.1%	837	1,167
Total compensation				85,530	78,814
Source: Author's calculations from Census Bureau, Bureau of Labor Statistics, and State of Delaware actuarial disclosures.					

Table 2a. Summary of Results: Delaware State Government Employees and Comparable Private Sector Employees. Pension benefits discounted at 10-year Treasury bond yield of 1.97%.						
Compensation component			**State and local government**	**Comparable private sector**	**State and local government**	**Comparable private sector**
Raw salary					$ 48,967	$ 55,039
Benefits			**As percent of salaries**		**Dollars**	
Total benefits			**98.5%**	**43.2%**	48,230	23,775
Paid leave			*10.9%*	*11.5%*	5,323	6,313
	Vacation		4.1%	6.0%	2,013	3,280
	Holiday		3.1%	3.6%	1,498	1,998
	Sick		2.7%	1.3%	1,342	688
	Personal		1.0%	0.6%	470	347
Insurance			22.1%	15.2%	10,834	8,388
	Life		0.2%	0.3%	103	160
	Health		21.5%	14.2%	10,530	7,827
	Short-term disability		0.1%	0.5%	64	253
	Long-term disability		0.3%	0.3%	137	149
Retirement and savings			*55.6%*	*5.5%*	27,244	3,004
	Defined benefit		46.6%	2.0%	22,812	1,105
	Defined contribution		0.0%	3.1%	-	1,701
	Retiree health coverage		9.1%	0.36%	4,433	198
Legally required benefits			*9.9%*	*11.0%*	4,830	6,071
	Social Security		6.2%	6.2%	3,036	3,412
	Medicare		1.6%	1.7%	764	930
	Federal unemployment insurance		0.0%	0.1%	1	77
	State unemployment insurance		0.4%	0.9%	191	484
	Workers' compensation		1.7%	2.1%	837	1,167
Total compensation					97,197	78,814
Source: Author's calculations from Census Bureau, Bureau of Labor Statistics, and State of Delaware actuarial disclosures.						
					48,230	23,775

Recent Reforms to State Employee Compensation

In 2011, Delaware enacted House Bill 1, which was designed to generate cost savings in state employee compensation. With regard to health coverage, these changes included:

- Increased employee contributions for health coverage: prior to House Bill 1, the state covered the full cost of the state's basic health plan, while employees covered any incremental costs if they chose a more expensive plan. House Bill 1 altered that formula, such that the state now pays between 88 and 96 percent of health premiums, depending on the plan chosen.
- Eliminated the so-called "Double State Share" in which state employees who are married to another state employee would not be subject to health coverage premiums. For newly-hired employees beginning in 2012, employees formerly covered under Double State Share provisions will pay $25 per month toward health coverage.
- Increased monthly employee premiums for the basic state health plan by about $21 for single employee coverage and $53 for family coverage.

House Bill 1 also made changes to the terms of pension coverage. For employees hired after 2012, House Bill 1:

- Increased the employee pension contribution rate from 3 percent to 5 percent of salary above $6,000;
- Increased the vesting period for pension benefits from 5 years to 10 years;
- Increased early retirement reduction factors from 0.2 percent to 0.4 percent;
- Increased the normal retirement age from 62 years of age with 5 years of service or 60 years of age with 15 years of service to 65 years of age with 10 years of service or 60 years of age with 20 years of service; and

- Removed overtime compensation from the calculation of wages for applying the 1.85 percent multiplier.

The calculations in this study incorporate the changes passed by House Bill 1 and implemented to date.

The pension changes passed as part of House Bill 1 will reduce pension compensation for newly-hired employees relative to those of current employees. The increase in the pension contribution rate from 3 percent to an average of almost 5 percent would reduce pension compensation by 2 percentage points, from slightly under 23 percent of wages (assuming pensions are discounted at the corporate bond yield of 4.1 percent) to about 20 percent of wages. Even after this reduction, pension compensation remains very generous relative to private sector levels. The increase in early retirement reduction factors means that employees choosing early retirement will accept a larger reduction in their benefits. However, even the higher reduction factors of 0.4 percent for each month that benefits are claimed early is less than actuarially fair, meaning that employees who retire early receive higher lifetime benefits than those who delay retirement. The increase in the normal retirement age for pension also reduces pension compensation, though eligibility for full benefits at any age following 30 years of service remains generous by private sector standards. The increase in the pension vesting period from five to 10 years also reduces pension compensation, but does so in a particularly troubling way: by denying benefits to state employees who worked for the state for up to 10 years. In the private sector a 10-year pension vesting period would be illegal, as long vesting periods can leave employees wo switch jobs with inadequate resources set aside for retirement.

Comparing Delaware to Other States

States compete against each other for jobs and investment and measure their accomplishments relative to their neighbors. Therefore it is worth comparing Delaware to two groups of states: first, the three states that neighbor Delaware; and second, states that, like Delaware, share an AAA bond rating.

The former measure shows how Delaware's management of public sector pay compares to its regional competitors, while the second shows how Delaware compares to other states that are deemed to be equally fiscally sound.

Conducting such comparisons in full is beyond the scope of this study. However, we can refer to the results of a 2014 study by Biggs and Richwine that compared compensation for state government employees across all 50 states. That study differs from the current study in certain ways with regard to the underlying salary data, certain assumptions, and the methodology used to calculate compensation. However, the study treats different states equally so the relative pay between different states should nevertheless provide meaningful comparative information.

Delaware's three neighboring states are Maryland, Pennsylvania and New Jersey. In the 2014 Biggs and Richwine study, the point estimate for Delaware's average compensation premium for state government employees was 10.2 percent, meaning that state employees received total pay and benefits in that study about 10 percent above private sector levels. Maryland was found to have a slightly lower compensation premium of 8.0 percent, while New Jersey and Pennsylvania had compensation premiums of 22.6 and 34.6 percent, respectively. Both New Jersey and Maryland face difficulties in funding their pension plans, and Pennsylvania in particular has a substantially more generous overall retirement package for state government employees than does the state of Delaware.

Delaware also competes in financial markets for borrowing costs. Of the 14 states who currently hold an AAA bond rating from Fitch, the average compensation premium reported in Biggs and Richwine (2014) was 4.6 percent. The overall average compensation premium among the 50 states in that study was 10.6 percent, indicating that states with better credit ratings paid smaller average salary and benefits premiums to public employees. Of the states with AAA credit ratings, Delaware's 10.2 percent compensation premium was the largest of the group. States with poorer credit ratings tended to pay

Table 3. State employee compensation premiums or penalties (Biggs and Richwine, 2014) for states with AAA bond ratings.	
State	Compensation differential
Alaska	5.9%
Delaware	10.2%
Florida	7.2%
Georgia	-2.8%
Maryland	8.0%
Missouri	6.9%
North Carolina	0.5%
South Carolina	2.8%
Tennessee	5.5%
Texas	7.3%
Utah	5.5%
Vermont	1.9%
Virginia	-5.5%
Average of AAA states	4.6%
50-state average	10.4%

public employees more generously. Public sector compensation is only one factor in determining a state's overall fiscal soundness. However, it is an important one, given the size and cost of public employee health and pension programs. Moreover, sound management of public sector compensation also may serve as a signal to financial markets that a state government is able to make sometimes-politically difficult policy choices in order to remain fiscally stable.

Conclusions

Public sector compensation is a matter both of budgetary priorities and fairness between workers and taxpayers. Government must decide how many employees it needs to fulfill necessary public functions. But there is no reason that public employees should receive pay and benefits that are either greater than or less than those paid to similarly-qualified private sector workers.

Delaware state government employees receive average salaries that are about 12.4 percent lower than those paid to private sector workers in Delaware, after controlling for differences in age, education and a number of other factors that are known predictors of pay. This implies that the average state government employee could receive a higher salary in the private sector. However, benefits in state government are so much more generous in the private sector that combined pay and benefits in state government exceeds private sector levels by between 8 and 23 percent. The health benefits, pensions and retiree health coverage provide in state jobs are substantially more generous than are typically paid in private sector positions, more than making up for the lower salaries paid to state government employees.

The substantial size of the compensation premium found for Delaware state government employees indicates health benefits, pensions and retiree health coverage that are significantly more generous than appears to be common in Delaware's private sector. The compensation premium paid to state government employees in Delaware implies that the state could attract and retain the employees it requires at substantially lower total cost than it currently expends on employee compensation.

While this study focuses on measuring differences in public and private sector compensation rather than explaining their causes, some discussion of root issues may be helpful. In general, compensation in the public sector is geared more toward benefits than salaries. In part, this is justifiable: public sector employees on average appear to be more risk-averse than private sector workers, which to many may justify focusing more on benefits than wages. [44] A second theory, however, is that benefits are more difficult for the public to track than salaries, a theory that the extended discussion involved with this study attests to. If the public cannot accurately gauge the value of public employee benefits – that is, if these benefits are effectively "hidden compensation" – then employees and their unions will focus on increasing benefits rather than wages.[45] This theory would explain not only why public sector compensation is tilted toward benefits, but how that focus on benefits could be lead to public employees receiving higher total compensation than similar private sector workers.

Since employee compensation, in particular pension and health benefits, are a budgetary matter, it may be informative to represent the compensation premium paid to Delaware state government employees in total dollar terms. In 2015, employees who participated in the Delaware State Employees' Pension Plan had combined salaries of about $1.91 billion. On top of those salaries, these employees receive or accrue annual benefits which, again depending on the valuation of pension benefits, raises total annual compensation to between $3.34 and $3.80 billion. If these employees worked in the private sector, it is likely their salaries would be around 12.4 percent higher, totaling about $2.15 billion. However, less generous benefits would mean total private sector compensation of about $3.08 billion. Thus, on an annual basis, Delaware state employees appear to receive total compensation that is between $260 and $720 million higher than they would be likely to receive were the Delaware state government to compensate employees equally with private sector employers.

There is no compelling reason why public sector employees should receive a total compensation premium over similarly-qualified private sector workers. Government jobs offer certain unique benefits, such as strong job security, that should allow them to pay *lower* wages and benefits than private sector positions. The fact that Delaware offers state employees higher compensation than similar workers receive in private sector jobs points toward potential savings to the state budget by rationalizing employee compensation policies.

End Notes

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[1] Matthew Albright. "Markell seeks changes to health care coverage." *The News Journal.* January 29, 2016

[2] See Biggs, Andrew G., and Jason Richwine. "Overpaid or underpaid? A state-by-state ranking of public-employee compensation." American Enterprise Institute Working Paper No. 415891. April 2014. Data drawn from U.S. Census Bureau's American Community Survey.

[3] For the purposes of this study and the data used in it, wages and salaries are treated identically.

[4] The methodology used here draws upon Biggs and Richwine (2014).

[5] Maury Gittleman and Brooks Pierce, "Compensation for State and Local Government Workers," *Journal of Economic Perspectives* 26(1) (2011): 217-242.

[6] Smith, Sharon P. "Pay differentials between federal government and private sector workers." *Indus. & Lab. Rel. Rev. 29* (1975): 179.

[7] A historical and methodological review of public-private pay comparisons can be found in Ramoni, Josefa, and Don Bellante. "The Relative Pay of Public Employees In The US: An Assessment Of Empirical Research." *International Business & Economics Research Journal (IBER)* 3.11 (2004).

[8] While most teachers are local government employees, a number appear to mistakenly report themselves as state government employees in survey data. For this reason, anyone identifying as a secondary-school teacher is deleted from the sample.

[9] The Census Bureau's Public Use Micro Areas (PUMAs) for Delaware include New Castle County (East Central)--Wilmington City; New Castle County (North)—Hockessin; New Castle County (West Central)--Newark City & Brookside; New Castle County (South)--Middletown Town, Bear & Glasgow; Kent County--Dover City; and Sussex County.

[10] See, for instance, Altonji, Joseph G., Lisa B. Kahn, and Jamin D. Speer. "Trends in Earnings Differentials across College Majors and the Changing Task Composition of Jobs." *The American Economic Review* 104.5 (2014): 387-393.

[11] L.L. Taylor, "Comparing Teacher Salaries: Insights from the U.S. Census," *Economics of Education Review*, 27(1), (2008): 48-57.

[12] For instance, even using a new database with improved detail on both employee and workplace characteristics, Troske could account for only a small part of firm-size pay differences. See Troske, Kenneth R. "Evidence on the employer size-wage premium from worker-establishment matched data." *Review of Economics and Statistics* 81.1 (1999): 15-26.

[13] Schanzenbach, Max M. "The State and Local Pay Penalty: The Effect of Skill and College Major." Northwestern Law & Econ Research Paper No. 13-36. October 29, 2013.

[14] Other alternatives explored considered the treatment of college majors and of occupations. As an alternate to using separate variables for years of education and undergraduate major, I created dummy variables which combine educational attainment and undergraduate college major into a single variable. For instance, separate variables are created for individuals with a BA who majored in engineering, a MA whose undergraduate major was English, and so forth. The overall results with regard to state government employee pay are not changed significantly versus including educational attainment and undergraduate major as separate variables. Likewise, most public-private pay comparisons using a human capital approach include only a small number of broad occupational categories. However, among consumers of policy analysis there is a strong desire for tight "job to job" comparisons. Using tight occupational controls does not significantly alter the results relative using broad occupational controls, indicating that broad occupation – along with the other variables included the analysis – capture most of the salary differences between workers.

[15] These figures draw on the Final Report of the State Employees Health Plan Task Force, released December 15, 2015.

[16] Bureau of Labor Statistics. "Medical care benefits: Share of premiums paid by employer and employee, private industry workers." National Compensation Survey, March 2015

http://www.bls.gov/ncs/ebs/benefits/2015/ownership/private/table10a.htm

[17] "State Employee Health Plan Spending." A report from The Pew Charitable Trusts and the John D. and Catherine T. MacArthur Foundation. Aug 2014.

[18] This section draws on information from Cheiron. "State of Delaware Postretirement Health Plan. Actuarial Valuation as of July 1, 2014" Produced December 2014.

[19] Note that these figures are for the Postretirement Health Plan as a whole, which in addition to "regular" state employees covers judges and state police. To the degree that judges and police have higher salaries than regular employees, the normal cost of the plan as a percentage of regular employees' wages is likely to be somewhat higher than the 9.44 percent average for the plan as a whole.

[20] Recall that ECEC stands for "employer contributions for employee compensation." Thus, employer contributions for current retirees' health coverage is not included.

[21] Source: Medical Expenditure Panel Survey. "Table II.A.2.h (2014) Percent of private-sector establishments that offer health insurance by health insurance offers to retirees by State: United States, 2014."

[22] Paul Fronstin and Nevin Adams, "Employment-Based Retiree Health Benefits: Trends in Access and Coverage, 1997–2010," Employee Benefit Research Institute. Issue Brief No. 377 (October 2012).

[23] Alice Zawacki, "Using The MEPS-IC To Study Retiree Health Insurance," U.S. Bureau of the Census. CES 06-13 (April, 2006).

[24] Aon Hewitt, Hot Topics in Retirement (2012), www.aon.com/attachments/human-capital-consulting/2012_Hot_Topics_in_Retirement_highlights.pdf

[25] Mercer, "New options for retiree medical coverage," (April 18, 2012) http://mthink.mercer.com/new-options-for-retiree-medical-coverage/

[26] Fronstin and Adams (2012).

[27] For instance, see Robert Clark and Melinda S. Morrill, "The Funding Status of Retiree Health Plans in the Public Sector," NBER Working Paper No. 16450, (October 2010): Table 2.

[28] Biggs and Richwine (2014).

[29] Cheiron. "Delaware State Employees' Pension Plan. Actuarial valuation as of June 30, 2015." Published January 2016.

[30] Wilshire Consulting. "2015 Report on State Retirement Systems: Funding Levels and Asset Allocation." February 25, 2015

[31] On this point see Biggs, Andrew G. "The Public Pension Quadrilemma: The Intersection of Investment Risk and Contribution Risk." *The Journal of Retirement 2.1* (2014): 115-127.

[32] Dale Belman and John Heywood. "The Truth About Public Employees: Overpaid or Underpaid?" Economic Policy Institute. June 1, 1993.

[33] Bureau of Labor Statistics, National Compensation Survey. Table 52. Savings and thrift plans: Maximum potential employer contribution, private industry workers. 2014. http://www.bls.gov/ncs/ebs/detailedprovisions/2014/ownership/private/table52a.txt

[34] See In re State Employees' Pension Plan, Del.Supr., 364 A.2d 1228 (1976).

[35] See Justin Falk, "Comparing Benefits and Total Compensation in the Federal Government and the Private Sector," Congressional Budget Office Working Paper 2012-4 (January 2012); and Congressional Budget Office, "The Underfunding of State and Local Pension Plans," (May 2011).

[36] Marshall B. Reinsdorf and David G. Lenze, "Defined Benefit Pensions and Household Income and Wealth," Bureau of Economic Analysis, *Research Spotlight* (August 2009): 51, https://www.bea.gov/scb/pdf/2009/08%20August/0806_benefits.pdf

[37] See Alicia H. Munnell ,Jean-Pierre Aubry, Joshua Hurwitz and Laura Quinby, "Public Plans and Short-Term Employees," NBER Working Paper No. w18448 (working paper, October 2012).

[38] Alicia H. Munnell, Jean-Pierre Aubry, Josh Hurwitz, and Laura Quinby, "Comparing Compensation: State-Local Versus Private Sector Workers," Center for Retirement Research at Boston College, State and Local Pension Plans No. 20 (Chestnut Hill, MA: September 2011).

[39] Marshall Reinsdorf, "Actuarial Measures of Defined Benefit Pension Plans for the National Accounts." Presentation to BEA Advisory Committee Meeting (May 11, 2012).

[40] Data for the Citibank Pension Discount Curve is available at https://www.soa.org/Professional-Interests/Pension/Resources/pen-resources-pension.aspx

[41] Delaware Public Employees Retirement System. Comprehensive Annual Financial Report. Issued December 22, 2015, p. 104.

[42] The vast majority of state and local government employees in Delaware are covered by Social Security, but a small number – about 4,000 out of 66,400 total employees in 2011 – appear not to be covered by Social Security. See Congressional Research Service. "Social Security: Mandatory Coverage of New State and Local Government Employees." July 25, 2011.

[43] The figures used here are drawn from Biggs and Richwine (2014).

[44] For instance, see Don Bellante and Albert N. Link, "Are Public Sector Workers More Risk Averse Than Private Sector Workers?" *Industrial and Labor Relations Review*, Vol. 34, No. 3 (April 1981): 408-412.

[45] Glaeser, Edward L., and Giacomo AM Ponzetto. "Shrouded costs of government: the political economy of state and local public pensions." *Journal of Public Economics* 116 (2014): 89-105.